Houston Health

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Preparing for Bioterrorism

Bioterrorism—an obscure term only a few years ago—creeps into everyday conversations in the aftermath of the September 11 and anthrax attacks, heightened terror alert levels and more recently the war in Iraq. Bioterrorism is the intentional use of infectious biological agents, either organisms or toxins, to kill or cause illness and instill fear in a population. In this issue, *Houston Health* highlights an HDHHS' program preparing Houston for an emergency resulting from the use of smallpox as a biological weapon, information on disease-causing agents and steps families can take to prepare for public emergencies.

Smallpox vaccine program fortifies city's preparedness

The Houston Department of Health and Human Services initiated its smallpox vaccination program in March, marking the start of a gradual increase in the preparedness level of the city against a bioterrorism attack using smallpox.

Approximately 300 health care professionals have received the vaccine that helps develop immunity to smallpox. They include department employees who make up the public health smallpox response team and would investigate and help control a possible or actual smallpox case or outbreak. The majority however are health care professionals from local hospitals who comprise health care smallpox teams and, if ever necessary, would diagnose and treat smallpox cases.

Additional public health and hospital personnel will continue to receive the vaccine.

Smallpox was a contagious, disfiguring disease that used to kill about 30 percent of those people who became infected. The World Health Organization declared smallpox eradicated in 1980 but bioterrorism experts believe it could now be used as a terror weapon and poses

see Vaccination, Page 2

Staff members with the Centers for Disease Control and Prevention practice vaccinating against smallpox.

Vaccination encompasses health care workers

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a new and serious threat because people no longer have immunity. The experts fear the disease could return through an attack by terrorists or a hostile nation.

The vaccine offers a high degree of protection against smallpox when given before or within four days after exposure to the variola virus, which causes the disease. As a result, the vaccination program will strengthen Houston's ability to prevent smallpox from spreading during an emergency.

Professionals in the public health smallpox response team include department nurses, doctors, epidemiologists and support staff. Hospital teams consist of emergency room physicians, intensive care doctors, nurses, specialists, technicians and support staff.

Over time, paramedics, police officers and other public safety workers will also receive vaccinations. That vaccination phase would begin only after the federal government indicates state and city health departments across the nation may begin to do so as part of the smallpox preparedness plan. Eventually, the department could end up vaccinating as many as 5,000 local responders against smallpox.

The smallpox vaccine is not available to the general population at this time. Still, the federal government announced last year that it has access to enough smallpox vaccine to vaccinate everyone in the country who might need it in the event of an emergency.

Although the vaccine is safe and most people only experience mild reactions such as a sore arm, fever and body aches, there are risks involved with smallpox vaccination. In the past, between 14 and 52 people per 1 million vaccinated for the first time experienced potentially life-threatening reactions such as severe skin rashes, ongoing skin infection resulting in the destruction of tissue and encephalitis, inflammation of the brain. Also, one to two people out of 1 million vaccinated died due to reactions to the vaccine.

The smallpox vaccine helps the body develop immunity to smallpox. The vaccine itself is not smallpox; it is made from a virus called vaccinia which is a pox-type virus related to smallpox.

The vaccine does not contain the smallpox virus; therefore, those vaccinated will not become infected with smallpox. It is made from a live virus called vaccinia, a pox-type virus related to smallpox.

The last case of smallpox in the United States was in 1949. Routine vaccination against smallpox was ceased among the general public in 1972 since it was no longer necessary for prevention. The last case in the world was in Somalia in 1977.

One confirmed case of smallpox would be considered a public health emergency.

Smallpox begins with a high fever, head and body aches and sometimes vomiting. A rash follows, spreads and progresses to raised bumps that crust, scab and fall off after about three weeks, leaving a pitted scar. Smallpox normally spreads from contact with infected people. The spread from one person to another generally requires direct and fairly prolonged face-to-face contact. Smallpox also can be spread through direct contact with infected bodily fluids or contaminated objects such as bedding or clothing. After exposure, it takes between seven and 17 days for symptoms to appear.

Indirect spread is less common. Rarely, smallpox has been spread by virus carried in the air in enclosed settings such as buildings, buses and trains.

A person with smallpox sometimes becomes contagious with the start of the fever, but the person becomes most contagious with the onset of the rash. The infected person is contagious until the last smallpox scab falls off.

No specific treatment exists for smallpox aside from the vaccine used to develop immunity. Supportive therapy such as intravenous fluids and medicine to control fever and pain benefits smallpox patients and antibiotics can help with secondary bacterial infections that may develop.

Basics of Biological Agents

Today, the public sees an increasing number of news reports about weapons of mass destruction including biological agents. Only a handful of people however possess a clear understanding about the different agents. During a public health emergency, knowledge about the agents will help dispel misinformation and diminish mass public fear and civil disruption. The next few pages provide specifics about Category A agents, those considered to pose the greatest threats. The Centers for Disease Control and Prevention, the leading agency for overall public health planning, classifies Category A agents as organisms that pose a risk to national security because they can be easily disseminated or transmitted from person to person, result in high mortality rates, have the potential for major public health impact and require special action for public health preparedness. Category A agents are anthrax, smallpox, plague, tularemia, botulism and viral hemorrhagic fevers.

Smallpox

Smallpox is a contagious, disfiguring and often-deadly disease caused by a virus. Smallpox was eradicated worldwide in the 1980s by immunization programs. These programs were discontinued in the United States in 1972. Federal officials believe it could be used as a terror weapon and poses a new and serious threat.

What are the signs and symptoms?

Illness may begin seven to 17 days following exposure. Symptoms include high fever (higher than 101° F), fatigue and head and back aches. A rash follows two to three days later. This rash is most prominent on the face, arms and legs. The rash starts with flat red lesions. Lesions become pus-filled and begin to crust early in the second week. Scabs develop and then separate and fall off after about three to four weeks. The majority of diagnosed individuals recover, but death occurs in up to 30 percent of the cases.

How is smallpox spread?

Direct and fairly prolonged face-to-face contact is required to spread smallpox from person to person. Smallpox also can be spread through direct contact with infected bodily fluids or contaminated objects such as bedding or clothing. Rarely, smallpox has been spread by virus carried in the air in enclosed settings such as buildings, buses and trains. Humans are the only natural hosts of smallpox.

What is the treatment?

There is no cure for smallpox, but vaccination can be used effectively to prevent infection from developing if given during a period of up to four days after a person has been exposed to the virus.

The vaccine

The vaccine helps the body develop immunity to smallpox, but *the vaccine itself is not smallpox.* The vaccine is made from a virus called *vaccinia* which is a pox-type virus related to smallpox. The vaccination site must be cared for carefully to prevent the vaccinia virus from spreading. Also, the vaccine can have side effects. The vaccine does not contain the smallpox virus and cannot give people smallpox.

Can I be vaccinated?

The smallpox vaccine is not available to the public at this time. Vaccine will be made available to protect people should a smallpox outbreak occur.

Who should not be vaccinated?

Because of health risks, the vaccine is not recommended for everyone. People who should not be vaccinated include pregnant women, people with immune systems problems (due to diseases like AIDS or treatments like chemotherapy), people with certain skin conditions and people living with someone less than a year old or people living with someone who should not be vaccinated. In the event of an outbreak, however, the smallpox vaccination would be offered to anyone directly exposed to the virus, regardless of health status because the risks associated with smallpox are far greater than those posed by the vaccine.

What is the Houston Department of Health and Human Services doing to protect me?

HDHHS is working with local health departments, Centers for Disease Control and Prevention, Texas Department of Health, hospitals, pharmacies and others to plan, prepare, respond to and recover from natural and man-made disasters, including smallpox. Vaccine will be made available to protect people should a smallpox outbreak occur.

I need more information.

Visit the Houston Department of Health and Human Services' website at **www.houstonhealth.org**.

Botulism

Botulinum toxin is produced by the bacterium *Clostridium botulinum* and is the most poisonous substance known to man.

The toxin produces a descending paralysis known as botulism, which is most often traced to the consumption of improperly canned or undercooked food tainted with the bacterium.

Botulinum toxin could be employed as a biological weapon via aerosol dissemination or the intentional contamination of food or drinks. The latter is considered the likeliest method for a bioterrorism attack because it is the easiest to carry out, requires the least amount of bioengineering and maintains the toxicity of the agent. Botulism is not contagious; only those who ingest or inhale the toxin become ill.

How do you become infected with the botulinum toxin?

Botulinum toxin can cause disease in humans in four different ways, only two of which are relevant to bioterrorism: ingestion and inhalation.

If botulinum toxin is ingested through contaminated food or drink, it affects nerve transmission, resulting in muscle paralysis. In the case of foodborne botulism, the first symptoms of this paralysis usually appear within 12 to 36 hours after ingestion and include double vision, drooping eyelids, dry mouth and difficulty swallowing and talking. Paralysis then spreads from the face and neck in a descending fashion to the rest of the body, eventually paralyzing respiratory muscles and often leading to death from respiratory failure. About 60 percent of those with untreated ingestional botulism will die.

Botulinum toxin also can be inhaled, but this second possible method of bioterrorism is considered less likely because it would be more difficult to carry out and could be less effective. Botulinum toxin is unstable in the environment, and a high degree of technical expertise would be necessary to render it suitable for aerosol release.

Botulism outbreaks are commonly caused by eating contaminated home-canned foods.

What are the signs and symptoms of ingestional botulism?

- **Blurred or double vision**
- **Drooping eyelids**
- **Slurred speech**
- **Difficulty swallowing**
- **Dry mouth, and**
- **Muscle weakness that always descends through the body: first shoulders are affected, then upper arms, lower arms, thighs, calves, etc. Infants with botulism appear listless and sluggish, feed poorly, are constipated and have a weak cry and poor muscle tone.**

What kind of treatments are available for botulism?

A commercially available antitoxin can halt the spread of paralysis caused by botulinum toxin, but it must be administered soon after the onset of symptoms. It would not reverse paralysis that already has occurred. Further treatment such as respiratory support may be required to sustain life, depending on the degree of paralysis. Paralysis will generally diminish with time.

Is an effective vaccine available to the general public?

A vaccine exists but is presently used only for laboratory workers and troops deployed to high-risk areas. The vaccine is in short supply and is very painful to receive. It also is not effective against all forms of the toxin. These factors, plus the current usage of botulinum toxin to treat certain medical conditions, make mass vaccination impractical and unlikely.

Anthrax

Anthrax is a bacterial disease that usually affects the skin but can affect the lungs or intestinal tract. Anthrax is generally found in unimmunized cattle and deer. All forms of the disease are treatable and curable with antibiotics, if detected early.

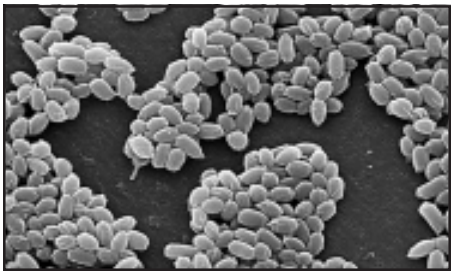
How can I be exposed to anthrax?
You can be exposed to anthrax if your skin comes into contact with the spores as a powdery substance, causing skin or cutaneous anthrax, or you can breathe them in, causing inhalation anthrax. Rarely, people eating undercooked infected beef or venison get intestinal anthrax.

What are the signs and symptoms of anthrax?
Cutaneous anthrax begins as an itchy rash or bump that develops into an ulcer with a black center. Blisters may appear. Beginning symptoms of inhalation anthrax include fever, fatigue, cough, chills and chest pain. After three to five days, the intense symptoms develop into sudden serious difficulty breathing, fever and shock.

How long does it take before someone exposed to anthrax develops symptoms?
The incubation period (time from exposure to first symptoms) is usually one to seven days. However, incubation periods of up to 60 days are possible.

Have there been any cases of anthrax in Houston recently?
Houston physicians will occasionally see a case of cutaneous anthrax in people who work in agriculture. Related to acts of bioterrorism, there have been no confirmed human or environmental test results in Houston at this time.

Who should take antibiotics for anthrax?
Any antibiotic should only be taken under a physician's supervision. Antibiotics for anthrax should only be prescribed for individuals with confirmed exposures to anthrax. Antibiotics prescribed after confirmed exposure can prevent the onset of symptoms. Antibiotics taken without confirmed exposure can cause serious side effects and can cause antibiotic resistance to other potentially fatal organisms in the future. Only a doctor can prescribe the appropriate antibiotic for each patient. Stockpiling antibiotics is strongly discouraged; acquiring antibiotics from any source other than your doctor and a pharmacy is not recommended.



Anthrax spores

Where can I get an anthrax immunization?
There are no commercially available vaccines for the general public for anthrax. The U.S. military has a vaccine for certain military personnel. It requires multiple injections and does not provide full immunity for approximately 18 months.

Can you get anthrax from meat?
Undercooked meat from an anthrax-infected animal could cause illness. American cattle and sheep are immunized for anthrax so the meat supply is not a source of human anthrax exposure. Anthrax is not found in seafood or poultry.

Who is at greatest risk for anthrax exposure?
Agricultural workers have the greatest long-term risk of anthrax exposure. The 2001 events related to exposures at national media outlets and at the U.S. Senate were deliberate criminal events. There were no confirmed exposures outside of the national media offices or the U.S. Senate and their postal handlers.

If I find an unusual substance, what should I do? What should I do if I receive a suspicious package or letter?
Do not panic. Consider all of the usual explanations for the presence of a fine-grained substance. Are you in an area where such substances are used? If there is no logical explanation, you should contact your building security or call 911 to report your concerns. Protect the substance from contaminating anyone else by covering it and/or closing the door. Wash your hands and face; remove any potentially contaminated clothing and wash your hands and face again. DO NOT REMOVE ANY SUSPICIOUS SUBSTANCE FROM WHERE YOU FOUND IT UNTIL AUTHORITIES EVALUATE IT.

- Do not shake or empty the contents of any suspicious package or envelope.
- Do not carry the package or envelope, show it to others or allow others to examine it.
- Put the package or envelope down on a stable surface; do not sniff, touch or taste it.

Laboratory testing of a suspicious substance can determine whether it is anthrax or any other biological agent. Laboratory testing cannot, however, identify every unknown substance. Differentiating between various inert and harmless substances such as talcum powder, sweeteners, coffee creamers and dry wall dust, is not an efficient use of tax-supported laboratory services and serves no benefit to the community's health.

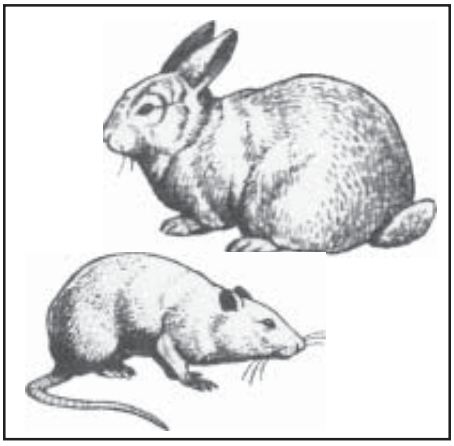
How is anthrax diagnosed?
Anthrax is diagnosed by testing specimens from individuals exposed to anthrax or who have signs and symptoms of infection.

Tularemia

Tularemia is an infectious disease caused by bacteria found in animals such as rodents, rabbits and hares. The bacteria are highly infectious. A small number of bacteria (10 to 50 organisms) can cause disease. If used as a terror weapon, the bacteria would likely be made airborne for exposure by inhalation. Persons who inhale an infectious aerosol would generally experience severe respiratory illness, including life-threatening pneumonia and systemic infection, if they were not treated. The bacteria that cause tularemia occurs widely in nature and could be isolated and grown in a laboratory.

What are the symptoms?

Symptoms usually appear three to five days after exposure to the bacteria. In some cases, these symptoms can take as long as 14 days to become apparent. Symptoms of tularemia include sudden fever, chills, headaches, muscle and joint aches, dry cough, progressive weakness and pneumonia. Persons with pneumonia can develop chest pain and bloody sputum and can have trouble breathing. The person can also stop breathing. Other symptoms of tularemia depend on how a person was exposed to the bacteria. These symptoms can include ulcers in the mouth, swollen and painful lymph glands, swollen and painful eyes and a sore throat.



Tularemia bacteria are found in animals such as rodents.

How is tularemia spread?

People can get tularemia many different ways. The most common are:

- through the bite of an infected insect (usually a tick or deerfly)
- handling infected animal carcasses
- eating or drinking contaminated food or water or,
- breathing in the bacteria that causes tularemia.

Tularemia is not spread from person to person.

What is the treatment?

There are antibiotics that are successfully used to fight this disease. A vaccine for tularemia is not currently available in the United States. A potential vaccine is under review by the Food and Drug Administration.

Plague

Plague is an infectious disease that affects animals and humans. It is caused by the bacterium *Yersinia pestis*. The bacteria are found in rodents and their fleas and occur in many areas of the world, including the United States. *Y. pestis* is easily destroyed by sunlight and drying. Even so, when released into air, the bacterium will survive for up to one hour, although this could vary depending on conditions.

What are the different types of plague?

Bubonic is the most common form of plague. This occurs when an infected flea bites a person or when materials contaminated with *Y. pestis* bacteria enter through a break in a person's skin. Patients develop swollen, tender lymph glands (called buboes) fever, headache, chills and weakness. Bubonic plague does not spread from person to person.

Pneumonic plague occurs when the bacteria infect the lungs. This type of plague can spread from person to person through the air. Transmission can take place if someone breathes in aerosolized bacteria, which could happen in a bioterrorist attack. Pneumonic plague is also spread by breathing in the bacteria suspended in respiratory droplets from a person or animal with pneumonic plague. Pneumonic plague may also occur if a person with bubonic or septicemic plague is untreated and the bacteria spread to the lungs.

Septicemic plague occurs when plague bacteria multiply in the blood. It can be a complication of pneumonic or bubonic plague or it can occur by itself. Septicemic plague does not spread from person to person.

Symptoms and treatment

With pneumonic plague, the first signs of illness are fever, headache, weakness and rapidly developing pneumonia with shortness of breath, chest pain, cough and sometimes bloody or watery sputum. The pneumonia progresses for two to four days and may cause respiratory failure and shock. Without early treatment, patients may die.

Early treatment of pneumonic plague is essential. To reduce the chance of death, antibiotics must be given within 24 hours of first symptoms. Streptomycin, gentamicin, the tetracyclines, and chloramphenicol are all effective against pneumonic plague.

Antibiotic treatment for seven days will protect people who have had direct, close contact with infected patients.

Preparing for Emergencies

In the event of biological or chemical weapon attack, emergency and public health authorities including the Houston Department of Health and Human Services will instruct the public about the best course of action. Instructions may be to shelter in place and seal the premises or to evacuate an area immediately. Specific measures that will help the public remain as safe as possible will be communicated through the news media. In the meantime, the best way to stay safe is to be as prepared as possible before any emergency occurs. Below are some important steps that the public can take to prepare for an emergency.

- **Have emergency supplies on hand** – one gallon of water per person, healthy food that doesn't need to be refrigerated or heated, cloth to filter air and use to cover your nose and mouth
- **Have basic supplies on hand** – flashlights, batteries, utility knife, local map, toilet paper, soap, feminine hygiene products, any medications needed, plastic sheeting, duct tape
- **Develop a family communication plan** – determine now how you will contact family members if disaster strikes and you are not together
- **Find out about other emergency response plans** – if you are a parent, find out what kind of response plans your child's school or daycare has. Know how they will communicate with families during an emergency
- **Be prepared to go** – make sure you keep at least half a tank of gas in your car in case you need to evacuate. Become familiar with alternate routes as well as other means of transportation in your area.

Biological Attack

A biological attack is the deliberate release of germs or other biological substances that can make you sick. Many agents must be inhaled, enter through a cut in the skin or be eaten to make you sick. Some biological agents, such as anthrax, do not cause contagious diseases. Others, like the smallpox virus, can result in diseases you can catch from other people.

Unlike an explosion, a biological attack may or may not be immediately obvious. While it is possible that you will see signs of a biological attack, as was sometimes the case with the anthrax mailings in October 2001, it is perhaps more likely that local health care workers will report a pattern of unusual illness, prompting an investigation by public health authorities. You will probably learn of the danger through an emergency radio or television broadcast, or some other signal used in your community. You might get a telephone call or emergency response workers may come to your door.

In the event of a biological attack, public health officials may not immediately be able to provide information on what you should do. It will take time to determine exactly what the illness is, how it should be treated and who is in danger. However, you should watch television, listen to the radio or check the Internet for official news including the following:

- Are you in the group or area authorities consider in danger?
- What are the signs and symptoms of the disease?
- Are medications or vaccines being distributed?
- Where?
- Who should get them?
- Where should you seek emergency medical care if you become sick?

Protect Yourself

If you become aware of an unusual and suspicious release of an unknown substance nearby, it doesn't hurt to protect yourself. Quickly get away. Cover your mouth and nose with layers of fabric that can filter the air but still allow breathing. Examples include two to three layers of cotton such as a t-shirt, handkerchief or towel. Otherwise, several layers of tissue or paper towels may help. Wash with soap and water, put on a new set of clothes and contact authorities.

Symptoms and Hygiene

At the time of a declared biological emergency, if a family member becomes sick, it is important to be suspicious. Do not automatically assume, however, that you should go to a hospital emergency room or that any illness is the result of the biological attack. Symptoms of many common illnesses may overlap. Use common sense, practice good hygiene and cleanliness to avoid spreading germs and seek medical advice.

Chemical Attack

A chemical attack is the deliberate release of a toxic gas, liquid or solid that can poison people and the environment.

Possible Signs of Chemical Threat

- Many people suffering from watery eyes, twitching, choking, having trouble breathing or losing coordination.
- Many sick or dead birds, fish or small animals are also cause for suspicion.

If You See Signs of Chemical Attack

- Quickly try to **define the impacted area** or where the chemical is coming from, if possible.
- Take immediate action to **get away**.
- If the chemical is inside a building where you are, get out of the building without passing through the contaminated area, if possible.
- Otherwise, it may be better to move as far away from where you suspect the chemical release is and "shelter-in-place."
- If you are outside, quickly decide what is the **fastest escape** from the chemical threat. Consider if you can get out of the area, or if you should follow plans to shelter-in-place.

If You Think You Have Been Exposed to a Chemical

If your eyes are watering, your skin is stinging and you are having trouble breathing, you may have been exposed to a chemical.

- If you think you may have been **exposed to a chemical, strip immediately** and **wash**.
- Look for a hose, fountain, or any source of **water**, and wash with **soap** if possible, being sure not to scrub the chemical into your skin.
- Seek emergency **medical attention**.

Nuclear Blast

A nuclear blast is an explosion with intense light and heat, a damaging pressure wave and widespread radioactive material that can contaminate the air, water and ground surfaces for miles around. While experts may predict at this time that a nuclear attack is less likely than other types, terrorism by its nature is unpredictable.

If There is a Nuclear Blast

- **Take cover** immediately, below ground if possible, though any shield or shelter will help protect you from the immediate effects of the blast and the pressure wave.
- Quickly **assess the situation**.
- Consider if you can get out of the area or if it would be better to go inside a building and follow your plan to **shelter-in-place.**
- In order to **limit the amount of radiation you are exposed to**, think about shielding, distance and time.
- **Shielding:** If you have a thick shield between yourself and the radioactive materials, you will be exposed to less.
- **Distance:** The farther away you are from the blast and the fallout the lower your exposure.
- **Time:** Minimizing time spent exposed will also reduce your risk.

Use **available information** to **assess the situation**. If there is a significant radiation threat, health care authorities may or may not advise you to take **potassium iodide**. It may or may not protect your thyroid gland, which is particularly vulnerable, from radioactive iodine exposure. Consider keeping potassium iodide in your emergency kit, learn what the appropriate doses are for each of your family members. Plan to **speak with your health care provider in advance** about what makes sense for your family.

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www.houstonhealth.org

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Bioterrorism Information

Organizations or civic groups interested in scheduling a presentation on bioterrorism or preparedness topics can call the Houston Department of Health and Human Services' Public Health Preparedness office at 713-558-2415.

Bioterrorism information is also available in the department's website at **www.houstonhealth.org.**